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ABSTRACT

Central Michigan University is one of 15 state supported four-year institutions of higher education in Michigan and draws its undergraduate enrollment from every county in the state. The document discusses plans for 1985-86 based on assumptions regarding the state population and statistics gathered in 1976-77. These include a headcount enrollment, student credit-hour and fiscal-year-equated student enrollment, and academic unit enrollments. (JMF)

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OFFICE OF INSTRUCTION AND RESEARCH

CENTRAL MICHIGAN UNIVERSITY

ASSUMPTIONS FOR PLANNING UNIVERSITY ENROLLMENT 1976-77 THROUGH 1986-87

VOLUME VI - OCTOBER 1976

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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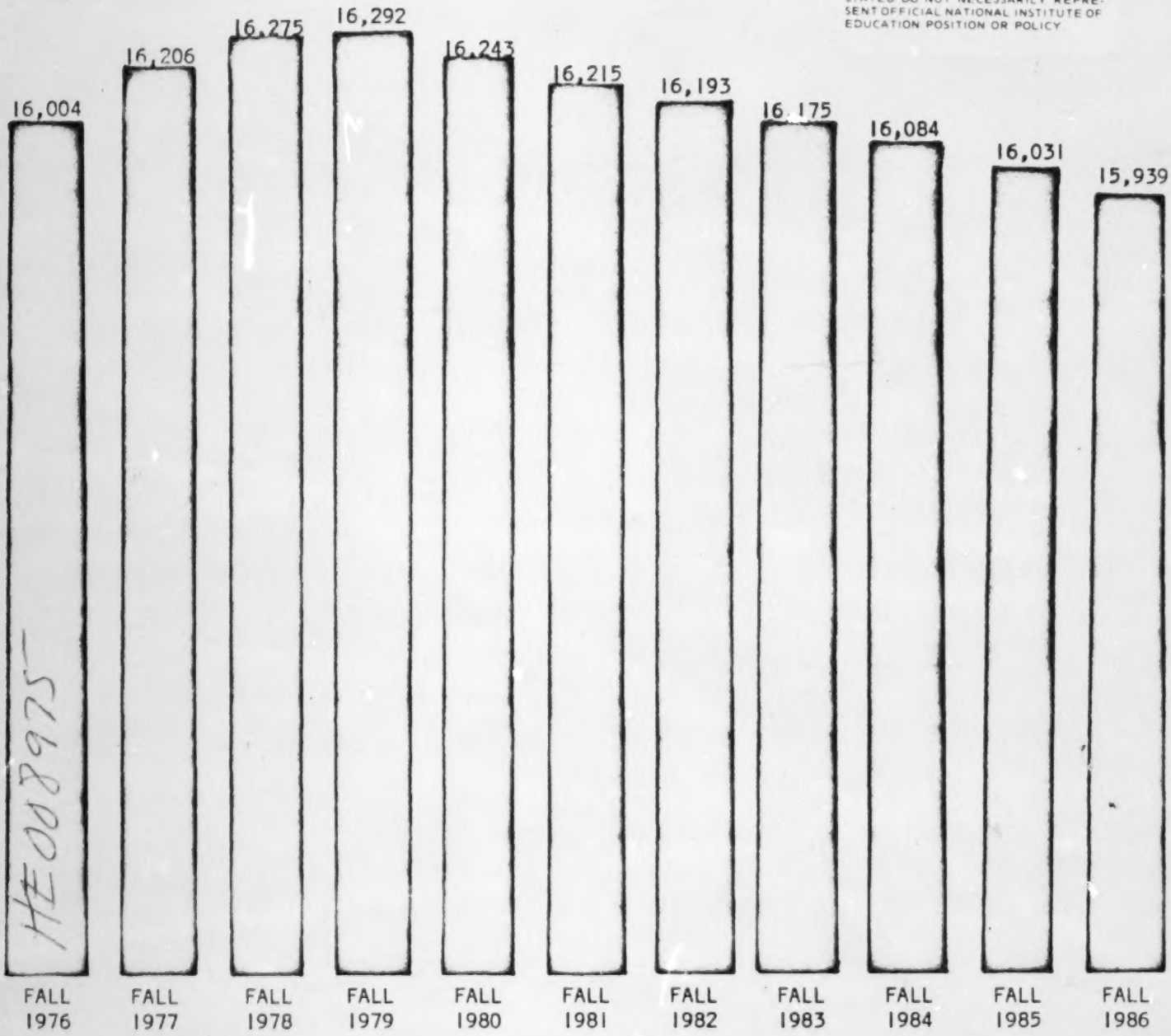

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ASSUMPTIONS FOR PLANNING
UNIVERSITY ENROLLMENT
1976-77 THROUGH 1985-86

HEADCOUNT ENROLLMENT

PART I

CONTEXT FOR PLANNING

Central Michigan University is a comprehensive institution of higher education in the State of Michigan. Although Central was originally established as a regional institution, it has matured to become a truly statewide institution. Even though it is geographically situated outside the population centers of the state and is only one of fifteen state-supported four-year institutions of higher education, it draws its undergraduate enrollment from every county of the the state. Figure I is a description of this demographic for the fall semester of the 1975-76 academic year. It shows that Central's undergraduate enrollment was overwhelmingly residents of the state with fifty-five (55%) percent of that enrollment being students who identified as their home residence one of the eight counties that comprise the "population corridor" from Central to metropolitan Detroit.

FIGURE I

UNDERGRADUATE ENROLLMENT

FALL 1975

Total Resident Enrollment: 12,381 (98.8%)

Total Non-Resident Enrollment: 142 (1.1%)

ASSUMPTION FOR PLANNING

An assumption for planning for the next decade is that Central's headcount enrollment will continue to be almost entirely comprised of Michigan state residents and that any growth or decline that the institution might experience during the next decade will be related to changes in the state resident enrollment.

A logical place to start a headcount enrollment forecasting process for Central Michigan University seems to reside in a projection of the resident college age population in the State of Michigan. Such a population projection was most recently accomplished by the Planning and Policy Analysis Division of the Department of Management and Budget (8). Beginning with actual data for the years 1970, 1971, 1972, 1973 and 1974 and continuing with projected data for the years 1975 through 1985 and also 1990, the anticipated changes in both the prime entry college age population pool (age 18) and the traditional undergraduate student population pool (ages 18 - 21) can be determined. This data is listed in Figures 2 and 3 with the changes for each five-year period of time indicated.

FIGURE 2

ACTUAL AND PROJECTED 18 YEAR OLD

POPULATION OF THE STATE OF MICHIGAN

YEAR	18 YEAR OLDS	FIVE-YEAR CHANGE
Actual 1970	172,402	
Actual 1971	195,509	
Actual 1972	188,680	
Actual 1973	195,825	
Actual 1974	199,124	
Actual 1975	200,435	
		+ 28,033
Projected 1976	206,190	
Projected 1977	202,357	
Projected 1978	205,666	
Projected 1979	199,799	
Projected 1980	198,443	
Projected 1981	193,225	
		- 12,965
Projected 1982	185,103	
Projected 1983	176,464	
Projected 1984	175,794	
Projected 1985	172,756	
Projected 1986	169,058	
		- 24,167
Projected 1990	146,854	
		- 22,204
TEN YEAR TOTAL DECREASE 1976 TO 1986		37,132
FOURTEEN YEAR TOTAL DECREASE 1976 TO 1990		59,408

FIGURE 3

ACTUAL AND PROJECTED 18 - 21 YEAR OLD

POPULATION OF THE STATE OF MICHIGAN

YEAR	18-21 YEAR OLDS	FIVE-YEAR CHANGE
Actual 1970	617,975	
Actual 1971	667,355	
Actual 1972	693,251	
Actual 1973	722,723	
Actual 1974	751,132	
Actual 1975	765,534	
		+ 147,559
Projected 1976	786,015	
Projected 1977	792,520	
Projected 1978	799,047	
Projected 1979	798,393	
Projected 1980	790,662	
Projected 1981	777,010	
		- 9,005
Projected 1982	767,775	
Projected 1983	749,376	
Projected 1984	740,807	
Projected 1985	734,208	
Projected 1986	719,626	
		- 57,384
Projected 1990	698,635	
		- 20,991
TEN YEAR TOTAL DECREASE 1976 TO 1986		66,389
FOURTEEN YEAR TOTAL DECREASE 1976 TO 1990		87,380

This aggregate data shows that the anticipated population pool of the traditional college age student (18 - 21 year olds) in the State of Michigan will decline slightly over the next five years and then accelerate in reduction throughout the following decade. Any long-range planning for higher education in the State of Michigan must not ignore the impact of this shrinking population pool.

PUBLIC FOUR-YEAR INSTITUTIONS' SHARE OF THE POOL

The distribution of higher education headcount enrollment among the types of postsecondary institutions in the State of Michigan further describes a context for planning. As the data presented in Figure 4 shows, the vast majority of the total headcount enrollment increase of the past five years in postsecondary institutions has occurred in the public two-year institutions. When these headcount enrollment figures are converted into institutional categorical percentages, as listed in Figure 5, a disturbing trend for the public four-year institutions becomes apparent.

FIGURE 4

OPENING FALL ENROLLMENT BY

TYPE OF INSTITUTION

YEAR	PUBLIC 4-YEAR INSTITUTIONS	PUBLIC 2-YEAR INSTITUTIONS	PRIVATE INSTITUTIONS	TOTAL
Fall 1970	217,802	125,553	52,348	395,703
Fall 1971	220,165	132,059	51,335	403,559
Fall 1972	218,667	137,634	50,658	406,959
Fall 1973	221,893	152,715	51,160	425,768
Fall 1974	229,627	173,643	55,273	458,543
Fall 1975	240,388	197,199	61,031	498,618

(Source: Michigan Educational Statistics 1975-76)

FIGURE 5

OPENING FALL ENROLLMENT BY TYPE OF INSTITUTION

AS PERCENTAGE OF HIGHER EDUCATION TOTAL

YEAR	PUBLIC 4-YEAR %	PUBLIC 2-YEAR %	PRIVATE %	TOTAL %
Fall 1970	55.1%	31.7%	13.2%	100.0%
Fall 1971	54.6%	32.7%	12.7%	100.0%
Fall 1972	53.7%	33.9%	12.4%	100.0%
Fall 1973	52.1%	35.9%	12.0%	100.0%
Fall 1974	50.0%	37.9%	12.1%	100.0%
Fall 1975	48.2%	39.6%	12.2%	100.0%

ASSUMPTION FOR PLANNING

The declining trend in the percentage of higher education enrollment that has occurred in public four-year institutions coupled with State of Michigan policy regarding the development and growth of public two-year institutions has led the Michigan Department of Education to project that forty-five (45%) percent of higher education enrollment will be in the public four-year institutions during the late 1970's and early 1980's. This projection is accepted as an assumption for planning.

The data of Figures 4 and 5 include all levels of enrollment -- freshmen through graduate. Since Central Michigan University is primarily an undergraduate institution and is mainly concerned with change indicators involving undergraduate enrollments, the data of Figures 4 and 5 is further expanded to include a partitioning of the public four-year institutional enrollments into undergraduate and graduate enrollments as presented in Figure 6.

FIGURE 6

OPENING FALL ENROLLMENT IN

PUBLIC FOUR-YEAR INSTITUTIONS

BY LEVEL OF PROGRAM

YEAR	UNDERGRADUATE	GRADUATE
Fall 1970	165,078	52,724
Fall 1971	169,178	50,987
Fall 1972	166,470	52,197
Fall 1973	166,464	55,429
Fall 1974	168,483	61,144
Fall 1975	171,501	68,887

(Source: MCSCP Enrollments in Michigan State Colleges and Universities)

If the data of Figures 3 and 6 are now examined together, the declining rate of enrollment of the 18 - 21 year old population pool as undergraduates in public four-year institutions can be determined. This declining rate of enrollment is presented in Figure 7 where the public four-year institutional undergraduate enrollment is expressed as a percentage of the 18 - 21 year old population pool.

FIGURE 7

YEAR	18-21 YEAR OLDS	PUBLIC 4-YEAR UNDERGRADUATE	PUBLIC 4-YEAR UNDERGRAD AS % OF 18-21 YR. OLDS
Fall 1970	617,975	165,078	26.71%
Fall 1971	667,355	169,178	25.35%
Fall 1972	693,251	166,470	24.01%
Fall 1973	722,723	166,464	23.03%
Fall 1974	751,132	168,483	22.43%
Fall 1975	765,534	171,501	22.40%

The declining trend indicated by Figure 7 is most disturbing when extended into the future. Such an extension of a declining enrollment rate into the future might appear questionable since one could argue that the public two-year institutions will quickly reach enrollment capacity and consequently, students will be "forced" to enroll in a public four-year institution. Another potential argument is that the large increase in public two-year institutional enrollments means a dramatic increase in the number of transfer students to the public four-year institutions only two years later. Thus, it is only a lag period of two years before the upper division enrollments in the public four-year institutions will increase dramatically.

Both of these arguments, however, seem to be questionable when examined in light of past occurrences. Since most public two-year institutions are community colleges which receive a substantial amount

of funding from local sources and often use local existing facilities for operating purposes, they are able to quite easily expand their facilities by using private or business facilities in their immediate area. Operating funds to meet the needs of their increasing enrollments can potentially be acquired through local tax structures. The argument concerning the impending transfer of public two-year institutional students to the public four-year institutions appears dubious when the public two-year enrollments are examined in terms of the degree intents of these students. As Figure 8 indicates, the majority of enrollment increase in the public two-year institutions has been in the non-bachelor degree/two-year terminal degree category for the past three years and increases in the future are expected to continue in this area.

FIGURE 8

OPENING FALL ENROLLMENT IN PUBLIC TWO-YEAR INSTITUTIONS BY DEGREE STATUS

YEAR	BACHELOR DEGREE	NON-BACHELOR/TWO-YEAR DEGREE
Fall 1973	78,190	74,525
Fall 1974	85,737	87,906
Fall 1975	95,309	101,890

Conversely, the argument in support of a continual decline in the enrollment rate for students attending the public four-year institutions is the economic argument. As the tuition rates at the

public four-year institutions continue to increase, the room and board rates continue to escalate and the State of Michigan's relative financial support of higher education continues to deteriorate relative to other funding priorities, the college bound youth of the state will continue to seek an educational experience which minimizes the costs to themselves -- enrollment in a public two-year institution.

ASSUMPTION FOR PLANNING

Unless the next decade includes a dramatic shift in the funding priorities of the State of Michigan coupled with a slowing of the cost of education at the public four-year institutions, the assumption for enrollment forecasting is that the enrollment rate of undergraduate students in the public four-year institutions will continue to decline as a disproportionate share of college bound youth are forced to select a public two-year institution instead of a four-year institution.

Perhaps the impact of the shrinking population pool and the declining enrollment rate at public four-year institutions can best be dramatized by postulating on the fall of 1985 as compared to the most recent experiences of the fall of 1975. Hypothesizing that five public four-year institutions -- "the big three" (Michigan State University, Wayne State University, University of Michigan at Ann Arbor), one Upper Peninsular institution (Michigan Tech University) and Central -- will maintain their fall 1975 new freshmen headcount

enrollment in the fall 1985 semester, these enrollments as a percentage of the available 18 year old population pool can be determined. If the same total percentage rate of enrollment of 18 year olds in public four-year institutions occurs in fall 1985 as in fall 1975, then the total number of headcount new freshmen can also be determined. This data is presented in Figure 9.

FIGURE 9

NEW FRESHMEN ENROLLMENTS IN PUBLIC FOUR YEAR INSTITUTIONS AS PERCENTAGE OF 18 YEAR OLD POPULATION POOL

(1985 Headcount Enrollment Assumed to be at 1975 Level for Central, Michigan State, Michigan Tech, University of Michigan - A.A., Wayne State)

Institution	Fall 1975 New Fresh Headcount	Fall 1975 As % Of 18 Year Old	Fall 1985 New Fresh Headcount	Fall 1985 As % Of 18 Year Old
Central	3,416	1.70%	3,416	1.98%
Eastern	2,364	1.18	?	?
Ferris	2,605	1.30	?	?
Grand Valley	1,102	0.55	?	?
Lake Superior	535	0.27	?	?
Michigan State	7,481	3.73	7,481	4.33
Michigan Tech	1,645	0.82	1,645	0.95
Northern	1,690	0.84	?	?
Oakland	1,354	0.68	?	?
Saginaw Valley	730	0.36	?	?
U. of Mich. - AA	4,626	2.31	4,626	2.68
U. of Michigan - Dearborn	938	0.47	?	?
U. of Michigan - Flint	654	0.33	?	?
Wayne State	2,640	1.32	2,640	1.53
Western	3,191	1.59	?	?
TOTAL	34,971	17.45%	30,146	17.45%

The impact of the hypothesis is that four thousand eight hundred twenty-five (4,825) fewer new freshmen will enroll in public four-year institutions in fall 1985 than enrolled in fall 1975. This represents a fourteen (14%) percent decrease across the system which would need to be absorbed by only ten (10) institutions. Expressed differently, this decrease of 4,825 students is more than the total combined new freshmen fall 1975 enrollment of five institutions, (Grand Valley, Lake Superior, Saginaw Valley, University of Michigan - Dearborn, University of Michigan - Flint)!

CENTRAL MICHIGAN UNIVERSITY'S SHARE OF THE PUBLIC FOUR-YEAR INSTITUTIONAL NEW FRESHMEN ENROLLMENT

An immediate assumption regarding future enrollments at Central Michigan University would be that Central's share of the public four-year institutional enrollment would remain constant and therefore, as the total enrollment of the public four-year institutions decreases, so would Central's enrollment. However, this assumption is extremely questionable when examined in light of recent experiences regarding enrollment at Central Michigan University. A historical account of fall semester applications for admission to Central by new freshmen and transfers demonstrates the invalidity of any assumption regarding a constant undergraduate enrollment rate for CMU. This historical account is listed in Figure 10.

FIGURE 10

CMU'S UNDERGRADUATE APPLICATIONS
AS A PERCENTAGE OF 18 - 21
YEAR OLD POPULATION POOL

YEAR	18-21 YEAR OLDS	CMU APPLICATIONS	CMU APPLICATIONS AS % OF 18-21 YEAR OLDS
Fall 1970	617,975	10,867	1.7585%
Fall 1971	667,355	10,708	1.6045%
Fall 1972	693,251	8,510	1.2275%
Fall 1973	722,723	8,215	1.1367%
Fall 1974	751,132	8,355	1.1112%
Fall 1975	765,534	10,094	1.3186%
Fall 1976	786,015	11,108 *	1.4132%

* Applications were no longer accepted after April 15 for the following fall 1976 semester. Had this restriction not been applied, an estimated 11,700 applications would have been received by the institution.

The dramatic reversal in the downward trend in applications is further deliniated when the transfer applications are removed from the total application figures and only the new freshmen applications are compared to their counterpart -- the available 18 year old pool in the State of Michigan. This comparison is presented in Figure 11.

FIGURE 11

CMU'S NEW FRESHMEN APPLICATIONS
AS A PERCENTAGE OF THE
18 YEAR OLD POPULATION POOL

YEAR	18 YEAR OLDS	CMU FRESHMEN APPLICATIONS	CMU FRESHMEN APPLICATIONS AS % OF 18 YEAR OLDS
Fall 1970	172,402	8,464	4.910%
Fall 1971	195,509	8,183	4.186%
Fall 1972	188,680	6,360	3.371%
Fall 1973	195,825	6,218	3.175%
Fall 1974	199,124	6,329	3.178%
Fall 1975	200,435	7,966	3.974%
Fall 1976	206,190	9,105 *	4.416%

* Applications were no longer accepted after April 15 for the following fall 1976 semester. Had this restriction not been applied, an estimated 9,700 applications would have been received by the institution.

This extraordinary increase in new freshmen applications has resulted in a dramatic growth in actual freshmen class enrollments which would have been even greater had not the University been forced to stop admitting fully qualified students because of a lack of on-campus housing facilities and operating funds necessary to a quality educational experience. New freshmen student enrollments for the prior five years and the new freshmen enrollment for the fall 1976 semester is presented in Figure 12.

FIGURE 12

NEW FRESHMEN ENROLLMENT

YEAR	CMU NEW FRESHMEN ENROLLMENT
Fall 1970	3,101
Fall 1971	2,990
Fall 1972	2,530
Fall 1973	2,936
Fall 1974	2,847
Fall 1975	3,416
Fall 1976	3,245*

* Enrollment limit due to lack of on-campus housing facilities and budgetary support.

Additional information regarding the attractiveness of Central Michigan University to the potential new freshmen student is the freshmen's own personal preference for institutional affiliation as determined by the student during his/her senior year in high school. Those high school seniors who take the ACT tests during their senior year (mandatory for any student desirous of receiving scholarship assistance from the State of Michigan) also indicated their first choice, second choice, and third choice as to institutional preference within the state. Data received from the ACT State Profile Reports (10) show that Central is the second most popular institution in the state as voiced by potential new freshmen students.

ASSUMPTION FOR PLANNING

The information presented in Figures 10-12 lends credence to an assumption that Central Michigan University will not experience an enrollment decline in new freshmen students during the majority of the next decade. In fact, enrollment will need to be limited due to facility availability and state budgetary support. New freshmen applications and resulting enrollment as a percentage of the available 18 year old pool will follow the experience of fall 1976.

The application of this assumption results in the anticipated number of new freshmen applications and headcount enrollment listed in Figure 13.

FIGURE 13

ANTICIPATED NEW FRESHMEN APPLICATIONS
AND RESULTING HEADCOUNT ENROLLMENT
FALL 1976 TO FALL 1986

YEAR	18 YEAR OLDS	FRESHMEN APPLICATIONS	APPLICATIONS As % OF 18 YR OLDS	FRESHMEN ENROLLMENT	FRESH. ENROLL. AS % OF APPLICATIONS
Fall 1970	172,402	8,464	4.910%	3,101	36.638%
Fall 1971	195,509	8,163	4.186	2,990	36.629
Fall 1972	188,680	6,360	3.371	2,530	39.780
Fall 1973	195,825	6,218	3.175	2,936	47.218
Fall 1974	199,124	6,329	3.178	2,847	44.983
Fall 1975	200,435	7,966	3.974	3,416	42.882
Fall 1976	206,190	9,100 (9,700)*	4.704	3,245 (3,500)	36.083
Fall 1977	202,357	9,511	4.700	3,433	36.1 %
Fall 1978	205,666	9,666	4.700	3,489	36.1
Fall 1979	199,799	9,391	4.700	3,390	36.1
Fall 1980	198,443	9,327	4.700	3,367	36.1
Fall 1981	193,225	9,082	4.700	3,279	36.1
Fall 1982	185,103	8,700	4.700	3,141	36.1
Fall 1983	176,464	8,294	4.700	2,994	36.1
Fall 1984	175,794	8,247	4.700	2,977	36.1
Fall 1985	172,756	8,120	4.700	2,931	36.1
Fall 1986	169,058	7,946	4.700	2,869	36.1

* Applications were no longer accepted after April 15 for the following fall 1976 semester. Had this restriction not been applied, an estimated 9,700 applications would have been received by the institution resulting in 3,500 new freshmen.

UNDERGRADUATE TRANSFER STUDENTS

Another source of new students to the University are transfer students. These students transfer to Central from a variety of schools including other public four-year institutions, public two-year institutions and private institutions. The number of fall transfer applications that have been received by Central during the last six years as well as the actual number of transfer enrollees is shown in Figure 14.

FIGURE 14

TRANSFER STUDENT APPLICATIONS
AND ACTUAL ENROLLMENT

YEAR	TRANSFER STUDENT APPLICATIONS	TRANSFER STUDENT ENROLLMENT
Fall 1970	2,403	1,155
Fall 1971	2,525	1,269
Fall 1972	2,150	1,244
Fall 1973	1,997	1,158
Fall 1974	2,026	1,186
Fall 1975	2,128	1,172
Fall 1976	2,300	1,133

ASSUMPTION FOR PLANNING

This historical trend indicates that the number of transfer students at Central has been relatively stable during the past six years.

increased recruitment efforts with potential transfer students should increase this number as the institution seeks to stablize its enrollment by increasing the upperclass enrollment. The assumption is that the number of transfer students that enroll each year will be in the 1,200-1,300 range for the duration of the 1970's with continued growth during the 1980's as recruitment efforts are increased.

GRADUATE STUDENTS

A third source of new students to the University are graduate students. The term "new graduate students" is correctly defined as a graduate student who is attending the University as a graduate student for the first time. Although this term is conceptually well defined, it lacks precision when examined in terms of the institution's data base. The University enrolls a majority of its graduate students as part-time graduate students who may have "unofficially" been enrolled in graduate courses for some time before being admitted into the gradute school or who only occasionally enroll in courses and spread their graduate student status over many semesters. In any case, it is more feasible to treat all graduate students that enroll each fall semester as new graduate students without regard to prior status. Figure 15 lists the historical graduate student enrollment for each of the past five fall semesters.

FIGURE 15

GRADUATE STUDENT ENROLLMENT
FALL 1972 -- FALL 1975

	FALL 1972	FALL 1973	FALL 1974	FALL 1975	FALL 1976
GRADUATE STUDENT ENROLLMENT	1,430	1,600	1,688	2,042	2,044

Institutional studies have shown that a significant portion of the graduate students who attend Central were also undergraduate students at CMU. Some of these undergraduate students enroll as graduate students the fall semester immediately following their graduation while others wait an intervening year before they enroll. This pattern of registration suggests a model for projecting the number of graduate students. The model determines the percentage that the fall semester's graduate enrollment is of the prior year's senior fall semester's enrollment combined with the junior class enrollment during the fall semester two years prior. Figure 16 lists these percentages.

FIGURE 16

GRADUTE STUDENT ENROLLMENT
AS A PERCENTAGE
OF TWO YEARS PRIOR JUNIORS
AND ONE YEAR PRIOR SENIORS

YEAR	JUNIOR 2-YEARS PRIOR	SENIOR 1-YEAR PRIOR	TOTAL OF JUNIOR & SENIOR	ACTUAL GRADUATE ENROLLMENT	GRADUATE AS % OF TOTAL
Fall 1972	2,932 ('70)	3,114 ('71)	6,046	1,430	23.65%
Fall 1973	3,356 ('71)	3,542 ('72)	6,898	1,600	23.20
Fall 1974	3,102 ('72)	3,418 ('73)	6,520	1,688	25.89
Fall 1975	2,999 ('73)	3,368 ('74)	6,367	2,042	32.07
Fall 1976	2,522 ('74)	3,322 ('75)	5,844	2,044	34.98

The experiences of the 1975 and 1976 fall semesters indicate that an increasing proportion of Central Michigan University bachelors degree graduates are enrolling as graduate students one or two years later.

ASSUMPTION FOR PLANNING

The assumption for enrollment projections is that graduate student enrollment will be 34% of the combined total of the prior year's senior headcount enrollment and the junior headcount enrollment of two years prior to the projection year. This enrollment percentage will be for the 1970's and will increase slightly each subsequent year to a level of forty (40%) percent in 1985 as new graduate offerings become established during the late 1970's and early 1980's.

STUDENT FLOW

Another ingredient in the process of enrollment forecasting is the determination of the flow of students within the University. This flow of students involves the input of new students, the dropping-out of some students at all levels, and the transition of students from one class level to the next class level.

Each year a portion of the total freshmen class enrollment is attributable to students that return to the University as freshmen either because they had not completed the sufficient number of hours to be classified as sophomores or they had left the University for a period of time during their initial freshmen year and were not returning to resume their programs. Historical analysis shows this trend was increasing until the fall 1976 experience when the number of returning freshmen, either measured as a headcount figure or as a percentage of the prior year's new freshmen enrollment, declined from previous levels. Figure 17 provides these measures.

FIGURE 17

RETURNING FRESHMEN STUDENTS

FALL 1972 -- FALL 1976

PRIOR YEAR'S NEW FRESHMEN ENROLLMENT	RETURNING FRESHMEN ENROLLMENT	RETURNING FRESHMEN AS PERCENTAGE OF PRIOR YEAR'S NEW FRESHMEN
Fall 1971 - 2,900	Fall 1972 - 241	8.0602%
Fall 1972 - 2,530	Fall 1973 - 315	12.4506
Fall 1973 - 2,936	Fall 1974 - 535	18.2221
Fall 1974 - 2,847	Fall 1975 - 590	20.7236
Fall 1975 - 3,416	Fall 1976 - 546	15.9836

ASSUMPTION FOR PLANNING

It is assumed that the number of returning freshmen as a percentage of the prior year's new freshmen enrollment will be maintained at the most current level. A percentage value of sixteen (16%) percent is assumed for projecting the number of returning freshmen students.

A historical profile of the undergraduate class enrollments for the past five years is provided in "student class flow" form by Figure 18. By considering the individual classification level enrollments in this way, projection percentages can be determined. These percentages describe an enrollment level for a specific classification level as a function of the prior year's enrollment level for the "feeder" classification level. That is, as one year's freshmen class flows to the next year's sophomore class, a percentage value is determined. Similar percentages are developed from the sophomore level to the junior level and from the junior level to the senior level.

FIGURE 18

UNDERGRADUATE ENROLLMENTS IN
STUDENT-FLOW FORM
FALL 1972 -- FALL 1975

YEAR	FRESHMEN	SOPHOMORES	JUNIOR	SENIOR
Fall 1972	2,936	3,226	3,102	3,542
Fall 1973	3,425	2,727	2,999	3,418
Fall 1974	3,832	2,935	2,522	3,368
Fall 1975	4,065	2,967	3,322	3,169
Fall 1976	3,901	3,568	3,081	3,251

FIGURE 19

UNDERGRADUATE CLASS FLOW
AS PERCENTAGES

YEAR	SOPHOMORES AS PERCENTAGE OF PREVIOUS YEAR'S FRESHMEN	JUNIORS AS PERCENTAGE OF PREVIOUS YEAR'S SOPHOMORES	SENIORS AS PERCENTAGE OF PREVIOUS YEAR'S JUNIORS
Fall 1970	95.03%	106.08%	109.73%
Fall 1971	97.52	98.53	106.21
Fall 1972	93.94	93.91	105.54
Fall 1973	92.88	92.96	110.19
Fall 1974	86.69	92.48	112.30
Fall 1975	77.43	113.19	125.65
Fall 1976	87.77	103.84	97.86

The fall 1976 semester did not follow the pattern of the previous three fall semesters as noted by the data of Figure 19. University studies are underway to identify factors that contributed to the sudden reversal in the historical trends. Conclusions of these studies will not be available until later in the academic year. Consequently, an assumption for planning is that future class flow patterns will replicate closely the fall 1976 experiences.

ASSUMPTION FOR PLANNING

1. The sophomore enrollment will be eighty-eight (88%) percent of the prior year's freshmen enrollment.

2. The junior enrollment will be one hundred one (101%) percent of the prior year's sophomore enrollment.

3. The senior enrollment will be one hundred (100%) percent of the prior year's junior enrollment.

The assumed percentages account for the flow of new transfer students into the system as well as the dropping-out of students during various time periods.

A unique classification level that comprises a portion of the University's enrollment is the special and guest classification level. Although the actual enrollment totals in this classification level are small as compared to the other levels, the totals have been increasing during recent years. Figure 20 lists these enrollments for the past five years.

FIGURE 20

ACTUAL SPECIAL & GUEST ENROLLMENT
FALL 1972 -- FALL 1976

	SPECIAL & GUEST ENROLLMENTS
Fall 1972	81
Fall 1973	91
Fall 1974	152
Fall 1975	143
Fall 1976	159

ASSUMPTION FOR PLANNING

For forecasting purposes, the assumption regarding special and guest student enrollment is that their enrollment will increase slightly during the planning period as follows:

Fall 1977	165
Fall 1978	170
Fall 1979	175
Fall 1980	180
Fall 1981 - Fall 1986	185

PROJECTED FALL SEMESTER HEADCOUNT ENROLLMENTS

Fall semester headcount enrollment projections are determined using the assumptions that have been stated in this document. In addition to these assumptions, a limiting factor on the size of an entering freshmen

class for the next five years must be noted. Dormitory capacity, as well as available housing in the Mt. Pleasant area, provides a limiting factor to the overall size of the freshmen and sophomore classes. An enrollment of approximately 7,200 freshmen and sophomores is this limiting factor and provides a measure for describing the yearly entering freshmen class. These projected fall semester headcount enrollments are given in Figure 21.

FIGURE 21

UNIVERSITY FALL HEADCOUNT ENROLLMENT

YEAR	NEW FRESH	TOTAL FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Fall 1972	2,530	2,936	3,226	3,102	3,542	81	1,430	14,317
Fall 1973	2,936	3,425	2,727	2,999	3,418	91	1,600	14,260
Fall 1974	2,847	3,832	2,935	2,522	3,368	152	1,688	14,497
Fall 1975	3,416	4,065	2,967	3,322	3,169	143	2,042	15,708
Fall 1976	3,245	3,901	3,568	3,081	3,251	159	2,044	16,004
Fall 1977	(3,300)	3,819	3,433	3,390	3,235	160	2,169	16,206
Fall 1978	(3,300)	3,844	3,361	3,261	3,560	165	2,084	16,275
Fall 1979	(3,300)	3,828	3,383	3,193	3,424	170	2,294	16,292
Fall 1980	(3,400)	3,928	3,367	3,214	3,353	175	2,206	16,243
Fall 1981	(3,300)	3,844	3,457	3,199	3,375	180	2,160	16,215
Fall 1982	(3,150)	4,145	2,996	3,141	3,536	185	2,190	16,193
Fall 1983	(3,000)	4,033	3,109	3,026	3,644	190	2,173	16,175
Fall 1984	(3,000)	3,980	3,025	3,140	3,510	190	2,239	16,084
Fall 1985	(2,900)	3,932	2,985	3,055	3,642	195	2,222	16,031
Fall 1986	(2,900)	3,854	2,949	3,018	3,544	200	2,374	15,939

WINTER HEADCOUNT ENROLLMENT

The headcount enrollments in any winter semester are assumed to be a function of the prior fall semester's headcount enrollment. This functional relationship involves the attrition rates from fall to winter semester, the influx of new students into the University during winter semester, the transition rates from one classification level to the next level, and the graduation of some students from the University at the end of the fall semester. All these factors influence winter semester enrollments and are implicit in the functional relationship between the fall semester's enrollment and the subsequent winter semester's enrollment.

To determine a functional relationship, Figure 22 presents a historical profile of the class headcount enrollments for the fall and winter semesters, 1971 - 1976.

FIGURE 22

FALL AND WINTER SEMESTER ENROLLMENTS

1971-72 THROUGH 1975-76

YEAR	FRESH	SOPH.	JUNIOR	SENIOR	SPEC	GRAD.
Fall 1971	3,434	3,303	3,356	3,168	54	1,480
Winter 1972	2,979	2,927	3,206	3,303	67	1,470
Fall 1972	2,936	3,226	3,102	3,542	81	1,430
Winter 1973	2,582	2,783	2,992	3,522	105	1,436
Fall 1973	3,425	2,727	2,999	3,418	101	1,600
Winter 1974	2,786	2,707	2,765	3,328	137	1,561
Fall 1974	3,832	2,935	2,522	3,368	152	1,688
Winter 1975	2,827	2,922	2,804	3,290	126	1,896
Fall 1975	4,065	2,967	3,322	3,169	143	2,042
Winter 1976	3,400	2,840	3,095	3,289	153	2,059

To determine a functional relationship between fall semester enrollments and winter semester enrollments, the headcount enrollments listed in Figure 22 are converted to a percentage functional relationship. Two relationships are determined. The first relationship is the percentage change at the same classification level (e.g. fall freshmen to winter freshmen) which is listed in Figure 23. The second relationship is the percentage change from one classification level to the next classification level (e.g. fall freshmen to winter sophomore) which is listed in Figure 24.

FIGURE 23

PERCENTAGE CHANGE FROM FALL SEMESTER
TO WINTER SEMESTER ENROLLMENTS
AT SAME CLASSIFICATION LEVEL
1971-72 THROUGH 1975-76

	FRESH % OF CHANGE	SOPH % OF CHANGE	JUNIOR % OF CHANGE	SENIOR % OF CHANGE	SPECIAL % OF CHANGE	GRAD % OF CHANGE
Fall 1971 to Winter 1972	-13.25	-11.38	- 4.47	+ 4.26	+24.07	- 0.68
Fall 1972 to Winter 1973	-12.06	-13.73	- 3.55	- 0.56	+29.63	+ 0.24
Fall 1973 to Winter 1974	-18.66	- 0.73	- 7.80	- 2.63	+35.64	- 2.44
Fall 1974 to Winter 1975	-26.23	- 0.44	+11.18	- 2.32	-20.63	+12.32
Fall 1975 to Winter 1976	-16.36	- 4.28	- 6.83	+ 3.79	+ 7.00	+ 0.83

FIGURE 24

PERCENTAGE CHANGE FROM FALL SEMESTER
TO WINTER SEMESTER ENROLLMENTS
AT THE NEXT CLASSIFICATION LEVEL
1971-72 THROUGH 1975-76

	FRESH. TO SOPH. % OF CHANGE	SOPH. TO JUN. % OF CHANGE	JUN. TO SEN. % OF CHANGE	SEN. TO GRAD % OF CHANGE
Fall 1971 to Winter 1972	-14.76	- 2.94	- 1.58	-53.60
Fall 1972 to Winter 1973	- 5.21	- 7.25	+13.54	-59.64
Fall 1973 to Winter 1974	-20.96	+ 1.39	+10.97	-54.33
Fall 1974 to Winter 1975	-23.75	- 4.46	+30.45	-43.71
Fall 1975 to Winter 1976	-30.14	+ 4.31	- 1.00	-35.03

Figures 24 and 25 present no distinguishable five-year trends. The variability in percentage changes is quite dramatic and makes it extremely difficult to project winter semester's enrollments. The process is further complicated by various extranneous variables such as the fluctuating economic condition of the State of Michigan. Also, the decreasing average credit hour load has led to students remaining in classification levels for longer periods of time simply because they had not earned the necessary number of credits to be classified at the next appropriate level. This could explain the dramatic changes at the freshmen and junior levels with the sophomore level being the "intermediate level." That is, a large number of fall, 1974 freshmen were really only a few earned hours short of being classified as sophomores. Having earned their hours during fall, 1974, they were then classified as sophomores in winter, 1975. This classification change led to the large decrease in the freshmen classification level enrollment for winter, 1975. A similar phenomena occurred at the sophomore level. But the loss of sophomores to the junior classification level was "counterbalanced" by the influx of new sophomores from the freshmen classification level.

ASSUMPTION FOR PLANNING

There appears to be no evidence to suggest that the experience of the most recent period should not occur in the future. Therefore, it seems reasonable to assume that the most recent occurence (Fall, 1975 to Winter, 1976) is more indicative of the future than more historical occurences. Consequently, the assumptions for predictive purposes are as follows:

1. Sixteen percent (16%) decrease in Freshmen headcount enrollment from fall semester to winter semester.
2. Four percent (4.0%) decrease in Sophomore headcount enrollment from fall semester to winter semester.
3. Seven percent (7.0%) decrease in Junior headcount enrollment from fall semester to winter semester.
4. Four percent (4.0%) increase in Senior headcount enrollment from fall semester to winter semester.
5. Seven percent (7.0%) increase in Special headcount enrollment from fall semester to winter semester.
6. One percent (1.0%) increase in Graduate headcount enrollment from fall semester to winter semester.

Using these six assumptions together with the projected fall semester headcount enrollments listed in Figure 21, the projected headcount enrollment for the winter semesters can be derived. Figure 25 lists these projected winter semester headcount enrollments.

FIGURE 25

UNIVERSITY WINTER HEADCOUNT ENROLLMENT

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Winter 72	2,979	2,927	3,206	3,303	67	1,470	13,952
Winter 73	2,582	2,783	2,992	3,522	105	1,436	13,420
Winter 74	2,786	2,707	2,765	3,328	137	1,561	13,284
Winter 75	2,827	2,922	2,804	3,290	126	1,898	13,867
Winter 76	3,400	2,840	3,095	3,289	153	2,059	14,836
Winter 77	3,277	3,425	2,865	3,381	170	2,064	15,182
Winter 78	3,208	3,297	3,352	3,204	177	2,257	15,495
Winter 79	3,132	3,227	3,224	3,748	182	2,116	15,629
Winter 80	3,118	3,150	3,157	3,606	187	2,476	15,694
Winter 81	3,258	3,136	3,082	3,531	193	2,382	15,582
Winter 82	3,207	3,277	3,069	3,447	198	2,401	15,599
Winter 83	3,079	3,226	3,207	3,432	198	2,410	15,552
Winter 84	2,937	3,097	3,156	3,586	198	2,466	15,440
Winter 85	2,903	2,954	3,030	3,530	198	2,646	15,261
Winter 86	2,862	2,919	2,890	3,388	198	2,673	14,930
Winter 87	2,804	2,878	2,856	3,232	198	2,632	14,600

SUMMER HEADCOUNT ENROLLMENT

The projected fall and winter semester enrollments can be used to arrive at the projected academic year enrollments. These academic year enrollments are the heart of the University's enrollment and furnish the majority of the funding base for the institution. However, the University both operates and is funded on a fiscal year basis which means that both the summer session and spring session enrollments are a vital ingredient in the University's life.

Summer session enrollments are projected in a manner similar to the methods employed for projecting the fall and winter semesters enrollments. Recent institutional studies have shown that the majority of undergraduate students that have attended summer sessions in the past were also students who were enrolled during the immediate prior academic year. Thus, a reasonable method for projecting summer session enrollments is to determine an expected percentage of the prior winter semester's enrollment that will enroll in the subsequent summer session. Figure 26 lists the prior winter semesters enrollments, the subsequent summer session enrollments, and the resultant percentage for each of the past five years.

FIGURE 26

SUMMER SESSION ENROLLMENTS AS A
PERCENTAGE OF PRIOR WINTER
SEMESTER'S HEADCOUNT ENROLLMENTS

YEAR	FRESH	SOPH	JUN	SEN
Winter 1972	2,979	2,927	3,206	3,303
Summer 1972	79	149	349	1,116
Percentage	2.65	5.09	10.89	33.79
Winter 1973	2,582	2,783	2,992	3,552
Summer 1973	62	148	379	1,018
Percentage	2.40	5.32	12.67	28.67
Winter 1974	2,786	2,707	2,765	3,328
Summer 1974	156	196	423	1,184
Percentage	5.60	7.24	15.30	35.58
Winter 1975	2,827	2,922	3,804	3,290
Summer 1975	176	293	493	1,225
Percentage	6.23	10.03	17.58	37.23
Winter 1976	3,400	2,840	3,095	3,289
Summer 1976	131	184	396	1,128
Percentage	3.85	6.48	12.79	34.30

Historically, summer session enrollments in institutions of higher education have increased beyond expectations in times of economic uncertainty and high unemployment. Lacking employment opportunities, individuals seem to either go back to or initially enroll in school. Such economic and employment conditions in the State of Michigan coupled with the concerted effort by the University to increase summer enrollments through special themes course, rotating class schedules, weekend classes, etc., certainly were leading causes for the enrollment increases at Central during recent years.

The summer of 1976 experience, however, did not continue the increasing trend. As the economic conditions in the State of Michigan continue to improve, potential summer students will no doubt be selecting to pursue work activities instead of school. How great this impact will be is debatable, but the need to "replenish the treasury" will lead many to seek work. This potential return to the summer labor force, however, might be balanced by the increasing number of students who utilize the summer sessions to "catch-up" in the credit hour loads. Recent institutional studies demonstrate that the summer session is a "planned for graduation" semester for many students.

ASSUMPTION FOR PLANNING

In light of these expectations, the following assumption is offered for projecting purposes.

1. One hundred thirty-five (135) freshmen will enroll in the summer sessions.
2. Seven (7%) percent of the prior winter semester's sophomores will enroll as sophomores during the summer sessions.
3. Thirteen (13%) percent of the prior winter semester's junior enrollment will enroll as juniors during the summer sessions.
4. Thirty-five (35%) percent of the prior winter semester's senior enrollment will enroll as seniors during the summer sessions.

The most important enrollment in the summer session is the graduate student enrollment. Institutional studies have shown that summer graduate student enrollment is not significantly correlated with academic year enrollment. In fact, summer graduate enrollment seems to more closely follow economic conditions as suggested by the summer 1976 experience.

ASSUMPTION FOR PLANNING

The assumption for planning is that 2,600 graduate students will enroll in each of the summer sessions. In addition, 145 special students will enroll.

Using this assumption, together with the projected winter semester's enrollments, the following projected summer headcount enrollments are derived and presented in Figure 27.

FIGURE 27

UNIVERSITY SUMMER HEADCOUNT ENROLLMENT

SUMMER 1977 - SUMMER 1987

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Summer 1972	79	149	349	1,116	106	2,053	3,852
Summer 1973	62	148	379	1,018	84	2,056	3,747
Summer 1974	156	196	423	1,184	132	2,279	4,370
Summer 1975	176	293	493	1,225	135	2,632	4,954
Summer 1976	131	184	396	1,128	142	2,571	4,552
Summer 1977	135	240	372	1,183	145	2,600	4,675
Summer 1978	135	231	436	1,121	145	2,600	4,668
Summer 1979	135	226	419	1,312	145	2,600	4,837
Summer 1980	135	221	410	1,262	145	2,600	4,773
Summer 1981	135	220	401	1,236	145	2,600	4,737
Summer 1982	135	229	399	1,206	145	2,600	4,714
Summer 1983	135	226	417	1,201	145	2,600	4,724
Summer 1984	135	217	410	1,255	145	2,600	4,762
Summer 1985	135	207	394	1,236	145	2,600	4,717
Summer 1986	135	204	376	1,186	145	2,600	4,646
Summer 1987	135	201	371	1,131	145	2,600	4,583

SPRING HEADCOUNT ENROLLMENT

To complete the forecasting process for the entire year (fiscal or calendar), enrollment projections for the spring semester are needed. Analytical studies have shown that spring session enrollments are highly correlated to the prior winter semester's enrollments. This is due to the nature of the session and its place in the academic calendar.

The historical spring semester enrollments are listed in Figure 28 together with the prior winter semester's enrollments. The appropriate percentages are also determined.

FIGURE 28

SPRING SEMESTER HEADCOUNT ENROLLMENTS
SPRING 1972 -- SPRING 1976

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD
Winter 1972	2,979	2,927	3,206	3,303	67	1,470
Spring 1972	13	133	392	1,110	14	369
% of Prior Classification Level	--	4.46	13.39	34.62	0.42	25.10
Winter 1973	2,582	2,783	2,992	3,522	105	1,436
Spring 1973	35	179	435	1,169	31	404
% of Prior Classification Level	--	6.93	15.63	39.07	0.88	28.13
Winter 1974	2,786	2,707	2,765	3,328	137	1,561
Spring 1974	39	187	461	1,367	29	425
% of Prior Classification Level	--	6.71	17.03	49.44	0.87	27.23
Winter 1975	2,827	2,922	2,804	3,290	126	1,898
Spring 1975	71	255	456	1,336	50	479
% of Prior Classification Level	--	9.02	15.61	47.65	1.52	25.24
Winter 1976	3,400	2,840	3,095	3,289	153	2,059
Spring 1976	46	216	449	1,211	57	485
% of Prior Classification Level	--	6.35	15.81	39.13	1.73	23.56

Based upon the experiences of the last few years, the following assumptions are made for the spring semester:

ASSUMPTION FOR PLANNING

1. Fifty (50) freshmen students will enroll in the spring semester.
2. Sophomore headcount enrollment will be seven percent (7%) of the prior winter semester's freshmen headcount enrollment.
3. Junior headcount enrollment will be sixteen percent (16%) of the prior winter semester's sophomore headcount enrollment.
4. Senior headcount enrollment will be forty percent (40%) of the prior winter semester's junior headcount enrollment.
5. Special headcount enrollment will be two percent (2%) of the prior winter semester's senior headcount enrollment.
6. Graduate headcount enrollment will be twenty-four percent (24%) of the prior winter semester's graduate headcount enrollment.

Applying these projection assumptions to the projected winter semester's headcount enrollments (Figure 25), the projected headcount enrollments for the spring semesters can be determined. These projected headcount enrollments are listed in Figure 29.

FIGURE 29

UNIVERSITY SPRING HEADCOUNT ENROLLMENT

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Spring 1972	13	133	392	1,110	14	369	2,031
Spring 1973	35	179	435	1,169	31	404	2,253
Spring 1974	39	187	461	1,367	29	425	2,508
Spring 1975	71	255	456	1,336	50	479	2,647
Spring 1976	46	216	449	1,211	57	485	2,464
Spring 1977	50	252	481	1,115	80	483	2,461
Spring 1978	50	235	493	1,176	72	529	2,555
Spring 1979	50	244	460	1,217	76	471	2,518
Spring 1980	50	234	477	1,137	79	496	2,473
Spring 1981	50	244	459	1,179	74	514	2,520
Spring 1982	50	235	478	1,134	76	512	2,485
Spring 1983	50	244	460	1,168	74	531	2,527
Spring 1984	50	237	478	1,126	76	527	2,494
Spring 1985	50	234	465	1,168	76	543	2,536
Spring 1986	50	232	459	1,136	76	539	2,492
Spring 1987	50	227	453	1,123	74	576	2,503

ASSUMPTIONS FOR PLANNING
UNIVERSITY STUDENT CREDIT HOUR AND
FISCAL YEAR EQUATED STUDENT ENROLLMENT
1976-77 THROUGH 1986-87
PART II

STUDENT CREDIT HOUR ENROLLMENT

Central Michigan University is a state-supported institution of higher education that historically has received its state appropriation primarily based upon an enrollment funded model. Increased attention on enrollment as the primary funding mechanism has recently occurred with the adoption of a formulized approach to higher education funding by all agencies of state government. What is extremely important to realize about this funding based upon enrollment is that it does not recognize headcount enrollments as the basis but rather a standardized measure referred to as a "fiscal year equated student (FYES)."

The definition of a FYES is:

31 undergraduate student credit hours = 1 FYES

or

24 graduate student credit hours = 1 FYES

Consequently, what is important for funding purposes is the number of student credit hour (SCH) enrollment at Central, not the amount of

headcount enrollment. This all important measure, student credit hours, is the summation of the number of course credits that each headcount student registers for during any particular semester. Thus, SCH is a function of the number of course credits registered for by the total headcount enrollment.

Once estimates of headcount enrollments have been determined, the enrollment forecasting process attempts to project the student credit hour enrollment. This is accomplished by determining an average course credit hour load per headcount student and then multiplying this average load factor by the anticipated headcount enrollment. This methodology is applied to each student classification level since historical analysis shows that the average course credit hour loads vary from student classification level to student classification level.

Figures 30, 31 and 32 describe the average course credit hour loads for each student classification level for each respective fall, winter and summer semester over the past six years.

FIGURE 30

AVERAGE COURSE CREDIT HOUR LOAD

BY STUDENT CLASSIFICATION LEVEL

FALL 1971 -- FALL 1976

	FRESH	SOPH	JUN	SEN	SPEC	GRAD
Fall 1971	14.50	15.05	15.24	15.08	8.35	6.73
Fall 1972	14.38	15.01	15.24	14.66	7.53	6.55
Fall 1973	14.36	15.43	15.28	14.66	7.34	6.81
Fall 1974	14.30	15.06	15.09	14.39	7.26	6.45
Fall 1975	14.54	14.78	14.78	14.31	7.71	6.38
Fall 1976	14.65	14.94	14.94	14.32	7.67	5.82

FIGURE 31

AVERAGE COURSE CREDIT HOUR LOAD

BY STUDENT CLASSIFICATION LEVEL

WINTER 1972 -- WINTER 1976

	FRESH	SOPH	JUN	SEN	SPEC	GRAD
Winter 1972	14.99	15.07	15.29	14.26	6.97	6.98
Winter 1973	15.06	15.24	15.59	14.75	7.89	6.90
Winter 1974	14.93	15.12	15.31	14.44	7.86	6.97
Winter 1975	14.39	14.88	15.06	14.36	8.29	6.59
Winter 1976	14.72	14.79	14.90	14.15	6.59	6.40

FIGURE 32

AVERAGE COURSE CREDIT HOUR LOAD

BY STUDENT CLASSIFICATION LEVEL

SUMMER 1972 -- SUMMER 1976

	FRESH	SOPH	JUN	SEN	SPEC	GRAD
Summer 1972	4.77	4.92	5.64	5.42	4.24	5.15
Summer 1973	5.42	4.99	5.69	5.49	5.42	5.36
Summer 1974	3.06	4.45	4.35	5.00	5.34	5.87
Summer 1975	4.22	5.09	5.34	5.37	4.19	5.52
Summer 1976	4.57	4.83	4.86	5.15	4.37	5.37

The general decline in average course credit hour loads that had been discernable for each semester for the past few years reversed in fall 1976. Such a reversal is most encouraging and indicates that the University concern regarding the disparity between enrollment and FYES enrollment may have already had a positive impact. Just how important this reversal is can be highlighted by a simulation.

Although a general decline in the average course credit hour load might seem inconsequential, the impact over an entire student body of 16,000 students is significant. If the institution's headcount enrollment were to remain fixed, a decrease in the average course credit

hour load of merely one-tenth of a credit hour (0.1) results in a loss of almost 1,800 SCH for the fall semester only. A decrease of one-tenth of a credit hour occurring in the winter semester would mean a loss of about 1,500 SCH. Thus, even though the institution's headcount enrollment would not change, the SCH enrollment would decrease by 3,300 SCH! This decrease translates into a reduction of approximately 110 FYES!

ASSUMPTION FOR PLANNING

Past experiences indicate that rising costs of education impact on students in ways that force them to carefully weigh a choice "to take one more class." Their reluctance to incur more cost is often supported by an inability to obtain classes of their choice due to a severely compressed class day and week. Recognizing this potential and the necessity to continue to reduce the disparity between headcount enrollment and FYES, strategies are being implemented to encourage students to "take one more class." A tuition policy is under study which would provide financial incentives for registering for a full credit hour load. Course scheduling is being modified to make the entire day available for classes and not just primarily the 9AM - 3PM time block.

Academic advising is being improved so that students have accurate advice regarding programs, courses and costs.

The assumption for forecasting purposes is that strategies for reducing the disparity between headcount enrollment and FYES will be implemented during the 1976-77 academic year resulting in average credit hour loads at levels slightly above the 1976-77 experiences. It appears too optimistic to expect credit hour loads to significantly increase in the immediate years of the planning period although this possibility gains credence during the latter years. It seems possible that as increased costs, which are now the burden of the student, shift to the institution, because of the new formula funding model of state government, students will register for more credits.

The projected average course credit hour loads for each fall, winter and summer semester of the planning period is listed in Figure 33.

FIGURE 33

PROJECTED AVERAGE COURSE

CREDIT HOUR LOADS

YEAR	FRESH	SOPH	JUNIOR	SENIOR	SPEC	GRAD
Actual Fall 1976	14.65	14.94	14.94	14.32	7.67	5.82
Fall 1977	14.70	15.00	15.00	14.30	7.70	5.80
Fall 1978 - Fall 1979	14.80	15.10	15.10	14.40	7.80	5.90
Fall 1980 - Fall 1986	14.90	15.20	15.20	14.50	7.90	6.00
Actual Winter 1976	14.72	14.79	14.90	14.15	6.59	6.40
Winter 1977	14.70	14.80	14.90	14.20	6.60	6.40
Winter 1978	14.80	14.90	15.00	14.20	6.70	6.50
Winter 1978 - Winter 1980	14.90	15.00	15.00	14.30	6.70	6.50
Winter 1981 - Winter 1987	15.00	15.10	15.10	14.40	6.80	6.60
Actual Summer 1976	4.57	4.83	4.86	5.15	4.37	5.37
Summer 1977	4.60	4.80	4.90	5.20	4.40	5.40
Summer 1978	4.60	4.90	5.00	5.20	4.40	5.50
Summer 1979 - Summer 1980	4.70	5.00	5.00	5.30	4.50	5.50
Summer 1981 - Summer 1986	4.80	5.10	5.10	5.40	4.60	5.60

To determine student credit hour (SCH) enrollment for each semester the assumed credit hour load for each student classification level must be multipled by the anticipated headcount enrollment for that semester (Figure 21, Figure 25, Figure 27, Figure 29). Figures 34, 35 and 36 present the results of this multiplication process for each fall, winter and summer semester of the planning period.

FIGURE 34

UNIVERSITY STUDENT CREDIT HOUR ENROLLMENT

FALL 1977 -- FALL 1986

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Fall 1972	42,218	48,437	47,289	51,925	610	9,363	199,842
Fall 1973	49,186	42,083	45,810	50,462	668	10,896	199,105
Fall 1974	54,783	44,205	38,049	48,457	1,256	10,892	197,642
Fall 1975	59,107	43,854	49,089	45,350	1,103	13,019	211,522
Fall 1976	57,140	53,305	46,032	46,138	1,097	12,155	215,867
Fall 1977	56,139	51,495	54,060	44,058	1,271	12,963	219,986
Fall 1978	55,174	50,751	52,352	51,898	1,326	12,361	223,862
Fall 1979	54,938	49,543	51,265	49,925	1,365	14,461	221,497
Fall 1980	57,797	49,658	50,373	49,228	1,422	14,148	222,626
Fall 1981	56,888	51,893	50,160	48,053	1,462	14,262	222,718
Fall 1982	54,623	51,072	52,410	47,850	1,462	14,316	221,733
Fall 1983	52,105	49,035	51,589	49,996	1,462	14,652	218,839
Fall 1984	51,494	46,770	49,522	49,213	1,462	15,720	214,181
Fall 1985	50,764	46,223	47,242	47,241	1,462	15,882	208,814
Fall 1986	49,736	45,570	46,679	45,066	1,462	15,636	204,149

FIGURE 35

UNIVERSITY STUDENT CREDIT HOUR ENROLLMENT

WINTER 1977 - WINTER 1987

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Winter 1972	44,670	44,097	48,984	47,096	467	10,259	195,573
Winter 1973	38,889	42,422	46,611	51,952	828	9,904	190,606
Winter 1974	41,583	40,939	42,337	48,053	1,077	10,880	184,869
Winter 1975	40,680	43,478	42,232	47,254	1,045	12,500	187,189
Winter 1976	50,034	42,012	46,120	46,554	1,008	13,178	198,906
Winter 1977	48,172	50,690	42,975	48,010	1,122	13,210	204,179
Winter 1978	47,478	49,125	50,280	45,497	1,186	15,122	208,688
Winter 1979	46,667	48,405	48,360	53,596	1,219	13,754	212,001
Winter 1980	46,458	48,250	47,355	51,566	1,253	16,094	210,976
Winter 1981	48,870	47,354	46,538	50,846	1,312	15,721	210,641
Winter 1982	48,105	49,483	46,342	49,637	1,346	15,847	210,760
Winter 1983	46,185	48,713	48,426	49,421	1,346	15,906	209,997
Winter 1984	44,055	46,765	47,656	51,638	1,346	16,276	207,736
Winter 1985	43,545	44,605	45,753	50,832	1,346	17,464	203,545
Winter 1986	42,930	44,077	43,639	48,787	1,346	17,642	198,421
Winter 1987	42,060	43,458	43,126	46,541	1,346	17,371	193,902

FIGURE 36

UNIVERSITY STUDENT CREDIT HOUR ENROLLMENT

SUMMER 1977 -- SUMMER 1986

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Summer 1972	377	733	1,969	6,051	449	10,576	20,155
Summer 1973	336	738	2,157	5,584	455	11,025	20,295
Summer 1974	477	872	1,841	5,923	1,497	13,381	23,991
Summer 1975	742	1,490	2,634	6,581	565	14,524	26,536
Summer 1976	599	888	1,925	5,810	621	13,794	23,637
Summer 1977	621	1,152	1,823	6,152	638	14,040	24,426
Summer 1978	621	1,132	2,180	5,829	638	14,300	24,700
Summer 1979	635	1,130	2,095	6,954	653	14,300	25,767
Summer 1980	635	1,105	2,050	6,688	653	14,300	25,431
Summer 1981	648	1,122	2,045	6,674	667	14,560	25,716
Summer 1982	648	1,168	2,035	6,512	667	14,560	25,590
Summer 1983	648	1,153	2,127	6,485	667	14,560	25,640
Summer 1984	648	1,107	2,091	6,777	667	14,560	25,850
Summer 1985	648	1,056	2,009	6,674	667	14,560	25,614
Summer 1986	648	1,040	1,918	6,404	667	14,560	25,237
Summer 1987	648	1,025	1,892	6,107	667	14,560	24,899

The final session for which student credit hour enrollment projections are needed is the spring (mini) session. The spring session is a three week session where the vast majority of courses that are offered are three credit hour courses. Occasionally, courses for one credit or two credits are offered in addition to the standard three credit hour courses. Such course offerings have resulted in a fairly standard credit hour load for all students of 2.90 credit hours.

ASSUMPTION FOR PLANNING

An assumption for planning is that the spring session average credit hour load for all students will be 2.90 credit hours for each spring session of the planning period.

Multiplying this assumed credit hour load by the anticipated headcount enrollment for each spring session (Figure 29), anticipated student credit hour enrollments for each spring session are determined. These anticipated enrollments are listed in Figure 37.

FIGURE 37

UNIVERSITY STUDENT CREDIT HOUR ENROLLMENT

SPRING 1977 -- SPRING 1987

YEAR	FRESH	SOPH	JUN	SEN	SPEC	GRAD	TOTAL
Spring 1972	56	418	1,165	3,177	42	1,063	5,921
Spring 1973	115	524	1,274	3,356	90	1,199	6,558
Spring 1974	111	613	1,466	3,863	84	1,226	7,363
Spring 1975	210	760	1,344	3,843	143	1,397	7,697
Spring 1976	141	639	1,310	3,550	146	1,370	7,156
Spring 1977	145	731	1,395	3,234	232	1,401	7,138
Spring 1978	145	682	1,430	3,410	209	1,534	7,410
Spring 1979	145	708	1,334	3,529	220	1,366	7,302
Spring 1980	145	679	1,383	3,297	229	1,438	7,171
Spring 1981	145	708	1,331	3,419	215	1,491	7,309
Spring 1982	145	682	1,386	3,289	220	1,485	7,207
Spring 1983	145	708	1,334	3,387	215	1,540	7,329
Spring 1984	145	687	1,386	3,265	220	1,528	7,231
Spring 1985	145	679	1,349	3,387	220	1,575	7,355
Spring 1986	145	673	1,331	3,294	220	1,563	7,226
Spring 1987	145	658	1,314	3,257	215	1,670	7,259

FISCAL YEAR EQUATED STUDENT ENROLLMENT

Central Michigan University is a public four-year institution which receives state appropriations for a fiscal year operation. Although the State of Michigan has adopted a fiscal year period from October 1 through September 30, the institutions of higher education remained on an operating fiscal year of July 1 through June 30. Consequently, fiscal year enrollment entails the enrollment of four semesters in the following order: summer, fall winter, spring. During the 1975-76 budget cycle, Central was required to submit enrollments on a calendar year basis: winter spring, summer, fall. This new measure of enrollment, referred to as calendar year equated students (CYES), was used by the State Legislature to determine state appropriations for 1975-76. However, since the institutions of higher education have not switched to a calendar year financial operation, the CYES measure is not included in this document. Since fiscal year enrollments are still the basis for institutional decision-making, these enrollments are presented in Figure 38 by converting student credit hour fiscal year totals (combining of Figures 34, 35, 36, and 37) to FYES totals according to the conversion formulae.

FIGURE 38

UNIVERSITY FISCAL YEAR EQUATED STUDENT ENROLLMENT

FISCAL YEAR 1976-77 -- FISCAL YEAR 1986-87

FISCAL YEAR	UNDERGRADUATE FYES	GRADUATE FYES	TOTAL FYES
1972-73	12,456	1,293	13,749
1973-74	12,181	1,418	13,599
1974-75	12,092	1,634	13,726
1975-76	12,876	1,806	14,682
1976-77	13,234	1,690	14,924
1977-78	13,447	1,819	15,266
1978-79	13,745	1,741	15,486
1979-80	13,520	1,923	15,443
1980-81	13,560	1,903	15,463
1981-82	13,556	1,923	15,479
1982-83	13,494	1,930	15,424
1983-84	13,304	1,959	15,263
1984-85	12,955	2,055	15,010
1985-86	12,594	2,069	14,663
1986-87	12,300	2,052	14,352

ASSUMPTIONS FOR PLANNING ACADEMIC UNIT ENROLLMENTS 1976-77 THROUGH 1981-82 PART III

INTRODUCTION

Factors influencing the spread of the University enrollment to schools, departments and other units are difficult to identify and quantify. Certainly the enrollment patterns of the prior year furnishes information concerning student interests and demands. In addition, other quantifiable factors such as major and minor choices, graduate admissions, transfer admissions and American College Testing Program student data give indications where changes in expected enrollments may occur. These factors serve as input at various stages in the forecasting process.

The major input in the determination of academic unit enrollment is the development of a historical "picture" of the institution's enrollments by academic programs and academic disciplines. This "picture" is then used to determine future enrollments in the academic disciplines. This historical "picture" is called an Induced-Course-Load-Matrix (ICLM) and because it is the critical element in the determination of academic unit enrollments, it is briefly discussed in the following narrative.

FIRST STAGE: THE HISTORICAL ICLM

Briefly defined, the ICLM is a way of partitioning student enrollment among the individual units of an institution according to academic program enrollments. It measures the enrollment impact on each individual unit according to the contribution from each academic program of the institution. An example is probably easiest of all to understand. The department of History within an institution offers courses that are taken during a semester by students that are either history majors, non-history majors or undecided majors. The ICLM will display the History department's enrollment according to all of the individual major program designators by student level. Thus, for example, the History department might be shown to have 535 student credit hours of enrollment in history courses attributable to 110 junior level students, 22 of which are english majors, 15 biology majors, 16 business majors, 26 journalism majors, 10 mathematics majors and 21 undecided majors. For large institutions, say 15,000 students, the ICLM matrix for the History department might look like Figure 39.

FIGURE 39

INDUCED COURSE LOAD MATRIX

FALL 1976

DEPARTMENT OF HISTORY

(The Amount of SCH Enrollments in Department of History Courses that are Attributable to Various Major Program Students)

MAJOR	FRESH	SOPH	JUNIOR	SENIOR
Accounting	35	18	6	0
Art	30	18	40	6
Biology	87	69	45	57
Business	6	15	48	40
Chemistry	18	6	6	6
Economics	10	0	12	6
English	42	38	66	42
French	3	3	6	3
Geography	0	6	0	15
History	178	263	360	285
Journalism	104	47	78	48
Mathematics	36	36	30	27
Music	17	27	13	11
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
Undecided	331	111	63	31

This ICLM shows that the student credit hour enrollment of History department courses is attributable to students majoring in many other areas than history. In fact, the student credit hours attributable to junior level majors in art, biology, business, english, jornalism and mathematics is almost as many as from junior level students majoring in history itself. Consequently, anticipated enrollment changes in these majors would impact directly on the History department!

When the ICLM for each individual unit is available, the entire institutional enrollment for a semester has been "recast" into a format that represents the first stage of the enrollment forecasting methodology. It focuses not on enrollments from the narrow focus of individual unit enrollments only, but broadens the focus onto all the academic program enrollments that serve as sources for an individual unit's enrollment.

SECOND STAGE: ANTICIPATED ACADEMIC PROGRAM ENROLLMENTS

The historical ICLM furnishes a description of enrollments accordingly to academic program by student level. As academic program enrollments change, the ICLM changes. That is, if 16 business majors accounted for 48 student credit hours in history courses during the fall semester, it would be reasonable to expect that if the number of business majors that enroll in history courses increases to 27 by the next fall semester, the anticipated student credit hour impact on the History department would also increase by some 33 student credit hours to 81 student credit hours. But such an expectation is built on the assumption that the number of business majors will increase. What makes such an assumption reasonable? -- that is the focus of this second stage.

Anticipated academic program enrollments can be estimated using a mathematical technique referred to as mathematical iteration. If we concentrate on five consecutive same term semesters (i.e. all fall semesters or all winter semesters) of academic program headcount enrollment for each of the four undergraduate classes, a five by four (5 X 4) matrix can be produced where the matrix entries are the headcount academic program enrollment by student level for each semester. Figure 40 provides an example of such a matrix.

FIGURE 40

HEADCOUNT MAJOR PROGRAM ENROLLMENT

MAJOR PROGRAM: HISTORY

	FRESH	SOPH	JUNIOR	SENIOR
Fall 1972	$x_{2,1}$	$x_{2,2}$	$x_{2,3}$	$x_{2,4}$
Fall 1973	$x_{3,1}$	$x_{3,2}$	$x_{3,3}$	$x_{3,4}$
Fall 1974	$x_{4,1}$	$x_{4,2}$	$x_{4,3}$	$x_{4,4}$
Fall 1975	$x_{5,1}$	$x_{5,2}$	$x_{5,3}$	$x_{5,4}$
Fall 1976	$x_{6,1}$	$x_{6,2}$	$x_{6,3}$	$x_{6,4}$

where $x_{i,j}$ is the number of history headcount majors for the ith fall semester and jth student level,

$$i = 2,3,4,5,6 \qquad j = 1,2,3,4$$

The 5 X 4 matrix of historical information provides a way of developing estimations of future academic program enrollments. Depending on an institution's attrition and transfer profile, a reasonable assumption

would be that the academic program enrollment for a semester is a function of the previous semester's enrollment. Also, the enrollment for a particular student classification level is a function of the prior student classification level and the same classification level for the previous semester. What we then have is that the academic program enrollment for a particular student classification level is a function of the academic program enrollment for that same student classification level and the prior student classification level of the previous semester.

Concentrating on the matrix of the history major for junior students, the historical 5 X 4 matrix enables the following estimation equations to be used.

$$x_{3,3} = a_3 x_{2,2} + b_3 x_{2,3}$$

$$x_{4,3} = a_3 x_{3,2} + b_3 x_{3,3}$$

$$x_{5,3} = a_3 x_{4,2} + b_3 x_{4,3}$$

$$x_{6,3} = a_3 x_{5,2} + b_3 x_{5,3}$$

The general iteration equation is then:

$$x_{i,3} = a_3 x_{i-1,2} + b_3 x_{i-1,3}$$

$$i = 3,4,5,6$$

Thus, the anticipated major program enrollments for the history major at the junior classification level would be:

$$x_{7,3} = a_3 x_{6,2} + b_3 x_{6,3}$$

$$x_{8,3} = a_3 x_{7,2} + b_3 x_{7,3}$$

$$x_{9,3} = a_3 x_{8,2} + b_3 x_{8,3}$$

$$x_{10,3} = a_3 x_{9,2} + b_3 x_{9,3}$$

$$x_{11,3} = a_3\ 10,2 + b_3 x_{10,3}$$

and continuing through as many iterations as is necessary in accord with the desired span of the enrollment forecast period.

The iteration is made specific when the xi,j are headcount academic program enrollments expressed as a percentage of total headcount enrollment. For example, if the institution's total junior student level enrollment was 2,000 students in Fall 1972 and 30 of those students registered as history majors, then the $x_{2,3}$ of the historical 5 X 4 matrix is one and one-half percent (.01500 = 30 ÷ 2,000). Similarly, if 2,200 junior level students registered during the Fall 1975 semester and 22 of them were history majors, then $x_{5,3}$ would be one percent (.0100 = 22 ÷ 2,200).

For illustration purposes, suppose that the historical 5 X 4 matrix had the following enrollment percentage data:

FIGURE 41

MAJOR PROGRAM:HISTORY

	FRESH	SOPH	JUNIOR	SENIOR
Fall 1972	.02100	.04100	.06780	.13140
Fall 1973	.01888	.03877	.06330	.12445
Fall 1974	.01767	.03722	.06115	.12222
Fall 1975	.01655	.03333	.05775	.11100
Fall 1976	.01445	.03013	.05225	.10056

and the estimation equations had produced the following values for a_3 and b_3 for use in the iteration process for determining future values:

$$a_3 = 6.98940 \quad , \quad b_3 = -3.44000$$

The value of the junior level percentage for the Fall 1977 semester would then be determined by the following equation:

$$\begin{aligned} x_{7,3} &= (6.98940)(x_{6,2}) + (-3.44000)(x_{6,3}) \\ &= (6.98940)(.03013) + (-3.44000)(.05225) \\ &= (.21059) + (-.17974) \\ &= .03085 \end{aligned}$$

In a like manner, the future percentage values for each classification level for each semester would be determined.

Finally, these future values are converted into anticipated headcount enrollment figures by multiplying the appropriate value by the anticipated total institutional classification level headcount enrollment.

For example, if the anticipated total institutional headcount enrollment of junior level students for Fall 1977 is 1,800 students, then the percentage value of .03085 for junior level history majors for Fall 1977 converts into 56 headcount students, (.03085 X 1,800), as junior history majors.

STAGE THREE: HISTORICAL ICLM AND FUTURE ACADEMIC PROGRAM ENROLLMENTS

Stage three is simply a "bringing together" of the first two stages. Stage one, the historical ICLM, took the institution's enrollment for a semester and displayed it in academic program format. The detailed format for the History department's enrollment according to major program contributors was provided in Figure 41. Stage two of the forecasting methodology provides a way to determine anticipated headcount academic program enrollments. In stage three, these anticipated headcount academic program enrollments serve as new input into the historical ICLM to determine anticipated impact on individual units because of changing academic program enrollments. What is developed might be thought of as a "future ICLM" -- it displays future enrollments using the anticipated future academic program enrollment together with the most current "spread" of academic progrm enrollments throughout individual units. However, not many academic programs at an institution are stable throughout time. Programs are continually under review and revision. Thus, stage three must also include an opportunity to "go into the ICLM" and change those portions of the ICLM that need changing in light of academic program

revisions. If a program no longer requires a particular course as part of that program, the ICLM should be changed to reflect this revision. Unless this change is made, the ICLM will continue to spread enrollment in this program as if the course was still a requirement of the program resulting in an incorrect estimation of enrollment impact on the unit that teaches this course.

PROCESS -- NOT A PROJECT

The estimation of academic unit enrollments is viewed as a continual process -- not a project to be completed. The process is continually rolling ahead while incorporating the most current information regarding academic program enrollments and institutional headcount enrollment trends. After each term is underway, the ICLM for that term is analyzed and corrected for use in the next estimation period. Continually corrected enrollment estimates are essential to the institutional planning process.

Central Michigan University
Instruction and Research

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